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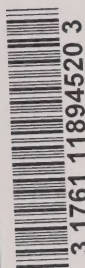
LABOUR MARKET INFORMATION AND ANALYSIS

MANPOWER REQUIREMENTS FOR
INFORMATION PROCESSING PERSONNEL

IN ONTARIO: 1981-1985

A publication of

**The Ontario
Manpower
Commission**



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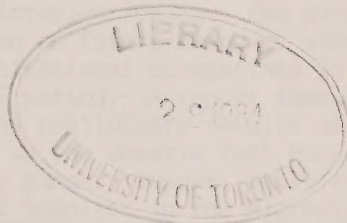


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MANPOWER REQUIREMENTS FOR

INFORMATION PROCESSING PERSONNEL

IN ONTARIO: 1981-1985



ONTARIO MANPOWER COMMISSION

May, 1982



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FOREWORD

One of the major responsibilities of the Labour Market Research Group of the Ontario Manpower Commission is to develop and provide information that can help to improve the functioning of the labour market in Ontario. To fulfill this mandate, the Group has implemented a comprehensive in-house research programme. In addition, from time to time, it carries out studies at the request of other Ministries and in some instances, retains outside experts to undertake studies on topics of interest to the Commission.

This study was undertaken by the Labour Market Research Group as a joint project with the Canadian Information Processing Society at the request of the Ontario Ministry of Colleges and Universities. The data for this study were collected through a mail survey by the Canadian Information Processing Society. The survey questionnaire was designed jointly by the Labour Market Research Group and the Planning and Development Branch of the Ontario Ministry of Colleges and Universities. The Labour Market Research Group carried out the analysis of the survey data and prepared the report.

The main objective of the study was to examine the current and projected manpower requirements in the information processing services sector over the 1981-1985 period. In addition to this study, the Labour Market Research Group has also carried out a number of other studies at the request of the Ontario Task Force on Microelectronics. The purpose of these studies was to develop information on future manpower requirements and supplies for selected technical and professional occupations in the microelectronics industry over the 1981-1985 period. A report summarizing the findings of these studies, including the preliminary results of the survey presented in this report, was released by the Ontario Task Force on Microelectronics in November 1981. The summary report, entitled Professional and Technical Manpower Requirements and Supplies in the Microelectronics Industry in Ontario: 1981-1985 is available from the Ontario Manpower Commission.

This report was prepared by Mr. Stanley But, Research Economist, under the supervision of Mrs. Ieva Kravis, Senior Economist and Mr. Bill Lampert, Manager of the Labour Market Services Section of the Ontario Manpower Commission.

Farid Siddiqui
Chief Economist
Ontario Manpower Commission

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INTRODUCTION

This report presents the findings of a survey on manpower requirements for selected professional and technical occupations in the information processing services sector in Ontario over the 1981-1985 period. The main objective of the study was to examine the current and projected manpower requirements for the following job categories: manager/supervisor, systems analyst, programmer, programmer/analyst, methods/procedures analyst, system software programmer, systems engineer/consultant, and computer operator.

The study was sponsored jointly by the Labour Market Research Group of the Ontario Manpower Commission, the Planning and Development Branch of the Ontario Ministry of Colleges and Universities and the Canadian Information Processing Society.

The data presented in this study were collected through a mail survey of 430 firms who are members of the Canadian Information Processing Society in Ontario. The survey questionnaire was designed jointly by the Ontario Manpower Commission and the Ontario Ministry of Colleges and Universities. The Canadian Information Processing Society co-ordinated the distribution and collection of the questionnaires from its members and other computer users. A.D.S. Consultants Limited was contracted to process the survey data, with funding from the Ontario Ministry of Colleges and Universities. The Labour Market Research Group of the Ontario Manpower Commission carried out the analysis.

The survey revealed some interesting trends on future manpower requirements, but readers are cautioned against generalizing on the basis of the survey results, which should be viewed only as an assessment of the information provided by the 430 responding firms.

This report has five parts: Chapter I discusses the employment of EDP personnel and occupational characteristics of the survey respondents; Chapter II analyzes the employment growth of the surveyed job categories over the 1979-1981 period and their projected employment to 1985; Chapter III examines the replacement patterns and hiring difficulties of these

occupations, and discusses the recruitment concerns of the respondents; Chapter IV describes the minimum hiring qualifications, sources of supply of new hires and types of training the respondents provide to their EDP staff. Finally, Chapter V summarizes the major findings of the report. The survey methodology, the questionnaire and the survey guide are presented in the appendices.

CHAPTER I

OCCUPATIONAL PROFILE OF SURVEY PARTICIPANTS

In order to provide a background for examining manpower requirements, this chapter describes in some detail EDP employment and occupational characteristics for the responding Ontario firms. These characteristics are based on the following eight professional and technical job categories (for detailed job descriptions, see Appendix C):

- . Manager/Supervisor
- . Systems Analyst
- . Programmer
- . Programmer/Analyst
- . Methods/Procedures Analyst
- . System Software Programmer
- . Systems Engineer/Consultant
- . Computer Operator

For the purposes of this study, information processing personnel, often referred to as electronic data processing (EDP) personnel, are those employees who provide information processing services to a primary end-user. Information processing services include the systematic collection, processing, storage, retrieval and delivery of information for application by end-users, who have some degree of control over the nature, purpose and scope of the data processing system.

1.1 Profile of Survey Participants

Four hundred and fifty of the 1,800 Ontario firms that received the survey questionnaire responded by the deadline of March 20th, 1981. Of these firms, twenty did not report employment in any of the professional and technical occupations under study; this report is, therefore, based on the responses from 430 firms or almost one-quarter of those firms that were sent the questionnaire.

A brief summary of the location, computer size and industry characteristics (see Appendix A, Table 1) of the responding firms indicates that:

- About one-half of the 430 responding firms are located in Metropolitan Toronto and Ottawa; Metropolitan Toronto alone accounts for over 41 per cent. The remaining one-half of the respondents are located in other parts of the province.
- In February 1981, the responding firms reported total permanent employment of 305,000, which represented about 8 per cent of the provincial paid non-agricultural employment at the time.
- About 56 per cent of the respondents have medium-sized computers of monthly rental value (MRV) between \$5,000 and \$99,999; another 22 per cent have small computers (MRV below \$5,000), and 17 per cent have large computers (MRV of \$100,000 and up). A small minority of the firms did not report information about their computer size.
- A breakdown of the respondents by industry shows that firms in the manufacturing sector account for just over 38 per cent of all respondents, and firms in the finance and insurance, service bureau and government sectors together account for another 20 per cent. The remaining respondents, i.e., firms in transportation, distribution, etc., are categorized under the all other industries sector.

A more detailed cross-tabulation of these characteristics indicates that over two-thirds of the respondents in the finance and insurance sector (68 per cent) are located in Metropolitan Toronto. There were no respondents in this sector located in Ottawa. In contrast, the majority of the respondents in the government sector (53 per cent) are located in Ottawa while only two respondents (7 per cent) were located in Metropolitan Toronto. Large computer installations are particularly prevalent in the service bureau and finance and insurance firms located in Metropolitan Toronto and the government sector in Ottawa.

1.2 Employment of EDP Personnel in the Responding Firms

Of the 430 respondents, 405 firms reported their EDP employment. These 405 firms reported a total of 7,926 EDP personnel, or an average of about 20 EDP staff per firm. This EDP employment figure represents between 2 and 3 per cent of the total permanent employment in the responding firms. Almost all the firms (93 per cent) have their central computers installed at the head office, and most of the EDP personnel (86 per cent) are located at the central computer installation.

Firms located in Metropolitan Toronto and Ottawa employ relatively more EDP personnel than firms in other parts of the province. These firms together account for almost one-half of the survey respondents and employ more than two-thirds of the total reported EDP personnel. The concentration of EDP employees is particularly prevalent in Ottawa-based firms which account for about 8 per cent of all respondents but some 17 per cent of the total EDP employment. On the basis of the number of EDP employees per firm, the Ottawa firms employ 1.4 times more personnel than the Metropolitan Toronto firms and some 4.5 times more than the firms in the rest of Ontario (see Table 1).

Although firms with large computers account for only 16 per cent of the respondents, they represent better than one-half of the total reported EDP employment. These firms employ an average of 62 EDP personnel per firm, which is approximately 5 times more than firms with medium computer installations and about 7 times more than firms with small computers.

Manufacturing firms account for over 28 per cent of the reported EDP employment, but average employment per firm is much higher in the finance and insurance, service bureau, and government sectors. Firms in these sectors combined account for 45 per cent of the reported EDP employment, and on the average, employ approximately 3 times as many EDP personnel as responding firms in any of the other industry sectors.

Table 1
Employment in Electronic Data Processing
by Location, Computer Size and Industry
1981

BREAKDOWN	Responding Firms ¹		EDP Employees		Average No. of EDP Employees Per Firm
	No.	% of Total	No.	% of Total	
<u>Location:</u>					
Metropolitan Toronto	167	41.2	4,805	60.6	28.8
Ottawa	34	8.4	1,335	16.8	39.3
Rest of Ontario	204	50.4	1,786	22.5	8.8
<u>Computer Size:</u>					
Small Computer	92	22.7	879	11.1	9.6
Medium Computer	233	57.5	2,901	36.6	12.5
Large Computer	65	16.0	3,995	50.4	61.5
Not-Reported	15	3.7	151	1.9	10.1
<u>Industry²:</u>					
Manufacturing	156	38.5	2,251	28.4	14.4
Finance & Insurance	24	5.9	1,049	13.2	43.7
Service Bureau	30	7.4	1,356	17.1	45.2
Government	25	6.2	1,159	14.6	46.4
All Other Industries	170	42.0	2,111	26.6	12.4
TOTAL	405	100.0	7,926	100.0	19.6

¹ Of the total 430 responding firms, 25 did not provide total employment of EDP personnel.

² For a more detailed breakdown by industry, see Appendix A, Table 2.

1.3 Employment by Job Category

The 430 responding firms reported that they employed a total of 5,611 workers in the eight job categories covered by this survey. This employment figure represents almost two-thirds of the total EDP staff and implies that about one-third are employed in other related functions not covered by this study.

Among the eight job categories, computer operators account for the largest employment share with about one-quarter of the total reported employment. Managers/supervisors account for another 18 per cent. Programmers, systems analysts and programmer/analysts each account for between 15 and 19 per cent, while system software programmers, methods/procedures analysts and systems engineers/consultants each account for 5 per cent or less of the employment in the eight job categories.

Table 2
Employment by Major Job Category
1981

<u>JOB CATEGORY</u>	<u>Number</u>	<u>Per Cent</u>
Manager/Supervisor	982	17.5
Systems Analyst	858	15.3
Programmer	1,081	19.3
Programmer/Analyst	832	14.9
Methods/Procedures Analyst	93	1.6
System Software Programmer	288	5.1
Systems Engineer/Consultant	111	1.9
Computer Operator	1,366	24.4
TOTAL	5,611	100.0

With the exception of managers/supervisors, the surveyed job categories were further classified according to senior and junior levels. Generally, staff in senior positions formulate problems to be solved, are usually competent to work at the highest technical level of all phases of

the activity and may give some direction and guidance to lower level classifications. Staff in junior positions generally work on a single activity under direct or immediate supervision. This classification shows the preponderance of senior staff; for example, almost one-third of the total employment is in the senior professional categories and about 13 per cent is in the senior computer operator category whereas junior staff account for 26 per cent and almost 12 per cent, respectively.

Table 3

Employment by Level of Job Category, 1981

<u>JOB CATEGORY</u>	<u>Number</u>	<u>Per Cent</u>
Manager/Supervisor	982	17.5
Senior Professional Staff	1,804	32.2
Junior Professional Staff	1,459	26.0
Senior Computer Operator	714	12.7
Junior Computer Operator	652	11.6
TOTAL	5,611	100.0

Firms demonstrate considerable variation in the frequency with which they employ the occupations covered by this survey. For example, managers/supervisors are employed by 9 out of every 10 firms and senior computer operators by 7 out of 10 firms. Methods/procedures analysts, system software programmers, and systems engineers/consultants, on the other hand, are employed by relatively few firms - usually less than 1 in 10. The variation in frequency of employment is also evident between senior and junior levels; for example, 33 per cent of the firms employ senior systems analysts but only 15 per cent - junior systems analysts.

For a detailed breakdown of employment by job category, see Appendix A, Table 3.

1.4 Variations in Occupational Distribution by Location, Computer Size and Industry

A comparison of the occupational distribution by location, computer size and industry (see Table 4) reveals some noteworthy variations that may influence future manpower requirements. For example:

- While the occupational distribution of firms in Metropolitan Toronto is quite similar to the overall provincial average, for Ottawa firms, programmers and computer operators account for a much greater share of their employment in the eight job categories than elsewhere in Ontario.
- Outside the two major EDP employment centers, managers/supervisors represent a large share of the studied employment, most likely because of the many respondents elsewhere in Ontario with small- and medium-sized computer installations.
- ✓ - Firms with small computers employ proportionately more managers/supervisors and computer operators.
- Firms with large computer installations, on the other hand, tend to have a much greater proportion of their employees working as programmers and systems analysts.
- Service bureaus employ proportionately more programmer/analysts but fewer programmers. The opposite is true in government establishments.
- Among the less utilized occupations, systems software programmers are employed much more frequently by finance and service bureau firms than by firms in any of the other industries.

CHAPTER II

EMPLOYMENT OUTLOOK OF EDP PERSONNEL TO 1985

This chapter analyzes first the historical employment growth of the surveyed job categories over the 1979-1981 period and then examines the employment projections made by the responding firms for these occupations to 1985. The analysis in this chapter is based on information provided by those respondents who reported employment for the corresponding years under review.

2.1 Employment Growth, 1979-1981

Employment in the surveyed job categories increased by about 13 per cent between 1979 and 1981, or almost 7 per cent per year. Employment in the different job categories, however, grew at varying rates. Systems engineers/consultants had the highest employment growth (29 per cent) over

Table 5

Employment By Job Category, 1979 and 1981

JOB CATEGORY	No. Employed ¹		Increase		Per Cent Change 1979-1981
	1979	1981	No.	%	
Manager/Supervisor	790	885	95	17.4	12.0
Systems Analyst	655	736	81	14.9	12.4
Programmer	633	754	121	22.2	19.1
Programmer/Analyst	616	694	78	14.3	12.7
Methods/Procedures Analyst	50	60	10	1.8	20.0
System Software Programmer	167	196	29	5.3	17.4
Systems Engineer/Consultant	72	93	21	3.9	29.2
Computer Operator	1,092	1,202	110	20.2	10.1
TOTAL	4,075	4,620	545	100.0	13.4

¹ Includes only those firms that reported employment for 1979, 1980 and 1981.

the 1979-1981 period, followed by methods/procedures analysts (20 per cent), and programmers (19 per cent). The employment growth for systems analysts was close to the average (13 per cent), but the growth rate for computer operators was well below average (10 per cent).

Of the 545 new jobs created over this period, programmers accounted for the largest employment share (22 per cent), followed by computer operators (20 per cent) and managers/supervisors (17 per cent). Systems analysts and programmer/analysts each accounted for about 14 per cent of the new jobs, while system software programmers, systems engineers/consultants, and methods/procedures analysts together accounted for only 11 per cent.

A breakdown of the historical employment growth by senior and junior levels, excluding managers/supervisors and computer operators, shows that senior personnel experienced a higher employment growth rate (18 per cent) than junior staff (13 per cent). The contrast between senior and junior computer operators over the same period is even more apparent: the employment growth of senior computer operators is almost 4 times higher than that of junior computer operators. In terms of the actual employment increase, the number of new jobs for senior personnel was almost double that for junior personnel. The ratio of new jobs for senior to junior computer operators was even greater - four to one. (For a detailed breakdown, see Appendix A, Table 5).

Table 6

Employment by Level of Job Category

JOB CATEGORY	No. Employed ¹		Increase		Per Cent Change 1979-1981
	1979	1981	No.	%	
Manager/Supervisor	790	885	95	17.4	12.0
Senior Professional Staff	1,194	1,407	213	39.1	17.8
Junior Professional Staff	999	1,126	127	23.3	12.7
Senior Computer Operator	567	654	87	16.0	15.3
Junior Computer Operator	525	548	23	4.2	4.4
TOTAL	4,075	4,620	545	100.0	13.4

¹ Includes only those firms who reported employment for 1979, 1980 and 1981.

2.2 Employment Growth by Location, Computer Size and Industry, 1979-1981

Almost two-thirds of the new jobs created in the responding firms over the 1979-1981 period were in firms located in Metropolitan Toronto and Ottawa; firms in Metropolitan Toronto alone accounted for almost one-half of the increase. Firms located in other parts of the province accounted for the remaining one-third of the new jobs created. In terms of the employment growth rate, firms located in Metropolitan Toronto (12 per cent) and Ottawa (11 per cent) experienced a lower employment growth than those located in the rest of Ontario (19 per cent) (see Appendix A, Table 6).

Firms with large- and medium-sized computers each accounted for about 40 per cent of the new jobs. Firms with small computers accounted for only 13 per cent of the new jobs, but their rate of employment growth was approximately double that for firms with large- and medium-sized computers.

The finance and insurance sector had the highest growth rate (28 per cent), compared with the overall average of 13 per cent for all industries. Firms in this sector also accounted for over one-quarter of the new jobs. On the other hand, employment in the government sector showed the lowest growth rate in the two years - about 9 per cent, and this sector contributed the smallest number of new jobs to the total increase.

2.3 Projected Employment Growth, 1981-1985

Employment in the surveyed occupations is expected to grow by about 32 per cent between 1981 and 1985, or approximately 8 per cent per year (see Table 7). This projected annual growth rate is only about 1 per cent higher than that for the past two years.

Among the surveyed job categories, systems engineers/consultants are expected to continue to have the highest growth rate and their employment is expected to almost double between 1981 and 1985. Other job categories with above average projected growth rates include programmers, programmer/

analysts, and system software programmers. The projected rate of growth for managers/supervisors and computer operators is expected to be well below average. On balance, the occupational distribution of the surveyed job categories is expected to change slightly in 1985 (see Appendix A, Table 7).

Of the 1,628 new jobs expected to be created by the responding firms over the next four years, programmers and programmer/analysts will each account for about one-quarter of the new jobs. Systems analysts will account for another 16 per cent, followed by computer operators (14 per cent) and managers/supervisors (10 per cent). While systems engineers/consultants and system software programmers will each account for about 6 per cent of the new jobs, methods/procedures analysts are expected to account for less than 2 per cent.

Table 7
Projected Employment by Job Category, 1985

JOB CATEGORY	No. Employed ¹		Increase		Per Cent Change 1981-1985
	1981	1985	No.	%	
Manager/Supervisor	935	1,094	159	9.8	17.0
Systems Analyst	798	1,056	258	15.8	32.3
Programmer	854	1,254	400	24.6	46.8
Programmer/Analyst	790	1,157	367	22.5	46.5
Methods/Procedures Analyst	86	114	28	1.7	32.6
System Software Programmer	230	324	94	5.8	40.7
Systems Engineer/Consultant	98	195	97	6.0	99.0
Computer Operator	1,244	1,469	225	13.8	18.1
TOTAL	5,035	6,663	1,628	100.0	32.3

¹ Includes only those firms who reported employment for 1981 and 1985.

Senior personnel, excluding managers/supervisors and computer operators, will continue to have a much higher employment growth (53 per cent) than junior personnel (31 per cent). In fact, compared to historical growth rates, the rate for senior personnel is expected to increase from 9 to 13 per cent per annum while for junior staff it will likely expand from 6 to 8 per cent per year. Of the 1,628 new jobs expected to be created between 1981 and 1985, the requirements for senior personnel, excluding managers/supervisors and computer operators, will be double those of junior staff. (For a detailed breakdown, see Appendix A, Table 8).

Table 8
Projected Employment by Level of Job Category

JOB CATEGORY	No. Employed ¹		Increase		Per Cent Change 1981-1985
	1981	1985	No.	%	
Manager/Supervisor	935	1,094	159	9.8	17.0
Senior Professional Staff	1,649	2,517	868	53.3	52.6
Junior Professional Staff	1,207	1,583	376	23.1	31.2
Senior Computer Operator	668	787	119	7.3	17.8
Junior Computer Operator	576	682	106	6.5	18.4
TOTAL	5,035	6,663	1,628	100.0	32.3

¹ Includes only those firms who reported employment for 1981 and 1985.

2.4 Projected Employment Growth by Location, Computer Size and Industry

Firms in Metropolitan Toronto and Ottawa will continue to contribute about two-thirds of the new jobs to be created between 1981 and 1985; firms in Metropolitan Toronto will continue to account for about one-half of the new jobs. The remaining one-third of the new jobs are expected to be in firms located in other parts of the province. In terms of employment growth

rates, firms located in Metropolitan Toronto and Ottawa are expected to have much lower rates of growth than firms elsewhere in Ontario (see Table 9).

In terms of the surveyed occupations, the employment growth rate for firms with small computers will be about 2 times higher than for firms with medium-sized computers and some 4 times higher than for firms with large computers. This expected high rate of growth will mean that about 22 per cent of the new jobs should be in firms with small computers. Firms with large computers, on the other hand, are expected to have a below average employment growth and contribute only 27 per cent to the new jobs in the surveyed job categories. This is substantially different from the past when large computer firms contributed about 42 per cent to the new jobs created between 1979 and 1981. Firms with medium-sized computer installations are expected to have average employment growth rates and create almost one-half of the new jobs.

Firms in the all other industries sector are projected to have the highest employment growth over the next four years, followed by firms in the service bureau sector. Firms in the manufacturing, finance and insurance, and government sectors are expected to have lower than average employment growth. For the finance and insurance sector, the projected annual growth rate represents a departure from past trend, i.e., on an annual basis, employment is projected to expand by only about 7 per cent between 1981 and 1985 compared with 14 per cent for 1979-1981.

About 41 per cent of the new positions over the 1981-1985 period are expected to originate in firms grouped in the all other industries sector. This is due mainly to the fact that this group includes the fast-growing but relatively small service industry firms serving the legal, medical, accounting and hospitality industry. Service bureaus and the manufacturing sector each are expected to account for another 19 per cent of the new jobs, while the finance and insurance and government sectors each will account for about only 10 per cent of the new jobs. (For a more detailed breakdown, see Appendix A, Table 9).

Table 9

Summary of Employment Growth by Location, Computer Size and Industry
1979-1981 and 1981-1985

BREAKDOWN	Annual Rate of Growth(%)		Per Cent Distribution of Employment Increase	
	1979-1981	1981-1985	1979-1981	1981-1985
<u>Location:</u>				
Metropolitan Toronto	5.9	7.5	49.0	51.0
Ottawa	5.5	7.2	16.9	17.5
Rest of Ontario	9.5	10.0	34.1	31.4
<u>Computer Size:</u>				
Small Computer	11.2	19.9	13.4	21.9
Medium Computer	6.5	9.2	39.3	46.2
Large Computer	5.6	4.6	41.5	27.2
Not-Reported	17.8	14.7	5.9	4.7
<u>Industry:</u>				
Manufacturing	6.7	6.6	22.8	18.9
Finance & Insurance	13.8	6.6	26.1	10.9
Service Bureau	5.3	9.2	13.8	19.5
Government	4.5	4.9	12.5	10.3
All Other Industries	5.7	11.2	25.0	40.5
TOTAL	6.7	8.1	100.0	100.0

CHAPTER III

REPLACEMENT PATTERNS AND HIRING DIFFICULTIES

This chapter examines the replacement patterns of the surveyed job categories in 1980, the expected replacement to 1985, hiring difficulties experienced by the responding firms and the perceived reasons for these difficulties. It concludes with the concerns expressed by the responding firms regarding the recruitment of EDP personnel in the 80's.

3.1 Replacement Patterns of the Surveyed Job Categories in 1980

For the purposes of this study, replacement patterns are examined in terms of the replacement rates reported by the responding firms for employees who left their positions for reasons of promotion, transfer, leaving company, etc. In 1980, the replacement rates for the surveyed job categories were mostly in the range of 10 per cent, though for some job categories the rates exceeded 30 per cent. As a result, the overall replacement rate for all surveyed job categories was 21 per cent (see Table 10).

Job categories with the highest average replacement rates were junior programmers (34 per cent), junior computer operators (32 per cent) and junior programmer/analysts (27 per cent). In fact, with the exception of managers/supervisors and systems analysts, junior personnel in all categories under study had higher replacement rates than senior personnel.

The overall replacement rates for all surveyed job categories in 1980 varied little between firms in different locations of the province; the variations by job categories were much more substantial, however. For example, the replacement rate for junior systems analysts ranged from a high of 39 per cent for the Ottawa firms to a low of 10 per cent for firms located in the rest of Ontario, i.e., excluding Metropolitan Toronto. The replacement rate for senior system software programmers ranged from a high of 22 per cent for the Metropolitan Toronto firms to a low of 5 per cent for the Ottawa firms (see Appendix A, Table 10).

Table 10
Replacement Rates, 1980

JOB CATEGORY	NO. of Reporting Firms	Per Cent of Companies Reporting Replacement Rates of			Average Replacement Rates (%)
		up to 10%	11 - 30%	Above 30%	
Manager/Supervisor	198	78.3	7.6	14.1	13.2
Senior Systems Analyst	80	63.8	12.5	23.8	22.5
Junior Systems Analyst	36	61.1	16.7	22.2	21.1
Senior Programmer	79	58.2	19.0	22.8	23.1
Junior Programmer	94	48.9	14.9	36.2	34.1
Senior Programmer/ Analyst	109	60.6	15.9	23.9	20.5
Junior Programmer/ Analyst	65	55.4	9.2	35.4	27.1
Senior Methods/ Procedures Analyst	19	73.7	10.5	15.8	15.8
Junior Methods/ Procedures Analyst	13	76.9	-	23.1	17.9
Senior System Software Programmer	39	82.1	5.1	12.8	12.5
Junior System Software Programmer	18	66.7	5.6	27.8	17.9
Senior Systems Engineer/ Consultant	21	90.5	4.8	4.8	5.7
Junior Systems Engineer/ Consultant	12	91.7	-	8.3	10.5
Senior Computer Operator	150	74.7	5.3	20.0	15.8
Junior Computer Operator	128	53.1	9.4	37.5	31.8
TOTAL	-	-	-	-	21.0

The replacement rates for the surveyed job categories also varied considerably between firms with different computer sizes. For example, the replacement rates for senior systems analysts in 1980 ranged from 36 per cent for firms with small computers to 18 per cent for firms with large computers; the corresponding figures for junior programmers were 57 per cent and 33 per cent, respectively.

The government sector had the highest overall replacement rate for the surveyed job categories (27 per cent), compared with an overall average of 21 per cent for all industries and 13 per cent for the service bureau firms which reported the lowest replacement rate of all sectors. It is noteworthy that the government sector had the highest rates for managers/supervisors, senior systems analysts and junior level programmers, programmer/analysts and computer operators. In contrast, the service bureau firms had the lowest replacement rates for these job categories. The comparison of the replacement rates between these two sectors is summarized as follows:

	<u>Replacement Rates For</u>	
	<u>Government Sector</u>	<u>Service Bureau</u>
Manager/Supervisor	20.7 %	5.8 %
Senior Systems Analyst	36.6 %	5.6 %
Junior Programmer	50.0 %	25.6 %
Junior Programmer/Analyst	54.3 %	14.3 %
Junior Computer Operator	37.3 %	16.9 %

3.2 Expected Replacement to 1985

Generally, for most job categories, over 50 per cent of the respondents expect future replacement rates to remain about the same as in 1980. Higher replacement rates are anticipated by about one-third of the responding firms, while a relatively small minority of the respondents expect these rates to be lower over the next four years (see Appendix A, Table 11).

Job categories for which firms expect higher replacement rates in the future include:

- senior systems analyst
- junior programmer
- senior programmer/analyst
- senior system software programmer

Job categories for which firms expect replacement rates to remain about the same as in 1980 include:

- manager/supervisor
- junior systems analyst
- senior and junior methods/procedures analyst
- senior and junior systems engineer/consultant
- senior computer operator

3.3 Occupational Hiring Difficulties

Hiring difficulties in this study pertain to those instances where a vacancy remains unfilled for longer than three months. Firms reported that, for the last twelve months, all senior personnel positions, excluding managers/supervisors, were more difficult to fill than junior positions. Job categories with over 40 per cent of the respondents reporting hiring difficulties included senior systems analysts, programmers, and system software programmers. In contrast, only about 8 per cent of the firms reported difficulties in hiring computer operators (see Table 11).

Firms located in Ottawa reported difficulty in hiring for almost all the surveyed job categories while Metropolitan Toronto firms reported relatively less difficulty. Also, compared to small- and medium-sized firms, firms with large computers reported greater difficulty in recruiting the more frequently utilized senior personnel, i.e., programmers, programmer/analysts, and computer operators.

Finally, service bureau firms reported hiring difficulties more frequently for most of the surveyed job categories with the exception of managers/supervisors and senior systems analysts. These difficulties were

Table 11
Hiring Difficulties

JOB CATEGORY	No. of Firms Reported Employment	No. of Firms Indicating Hiring Difficulties	As a % of Responding Firms
Manager/Supervisor	388	53	13.7
Senior Systems Analyst	140	59	42.1
Junior Systems Analyst	65	18	27.7
Senior Programmer	156	65	41.7
Junior Programmer	167	36	21.6
Senior Programmer/ Analyst	185	64	34.6
Junior Programmer/ Analyst	121	32	26.4
Senior Methods/ Procedures Analyst	37	6	16.2
Junior Methods/ Procedures Analyst	25	0	-
Senior System Software Programmer	77	31	40.3
Junior System Software Programmer	42	8	19.0
Senior Systems Engineer/ Consultant	29	9	31.0
Junior Systems Engineer/ Consultant	17	3	17.6
Senior Computer Operator	305	26	8.5
Junior Computer Operator	247	19	7.7
TOTAL	-	-	-

particularly pronounced for senior programmers - 90 per cent of the service bureau firms reported problems in filling these positions. The finance and insurance firms reported more difficulty in hiring managers/supervisors than firms in any of the other industry sectors (see Appendix A, Table 12).

3.4 Perceived Reasons for Hiring Difficulties

The most commonly cited reason for hiring difficulties was a shortage or a lack of qualified people available to fill the current manpower requirements. Relatively few of the respondents attributed hiring difficulties to high turnover, and even fewer felt that environmental changes, such as the introduction of new technologies or market expansion, contributed to hiring problems. Other less common reasons expressed by the respondents included lack of professional accreditation programmes for the EDP personnel; difficulty in attracting EDP professionals to remote job sites; difficulty in maintaining competent staff while facing rising salary levels of the EDP professionals and fiscal restraints; and limited promotion prospects for their EDP staff in the future.

Seventy per cent of the respondents indicated shortages of qualified people as the main reason for hiring difficulties in the case of senior level positions of systems analyst, programmer/analyst, system software programmer, and systems engineer/consultant. In contrast, just over 40 per cent of the respondents felt that shortages of managers/supervisors and senior computer operators were responsible for hiring problems. It is noteworthy that in the case of junior computer operators, turnover was cited as the main reason for hiring difficulties (see Table 12).

Table 12
Reasons For Hiring Difficulties

JOB CATEGORY	No. of Responding Firms	Indicated Reasons for Hiring Difficulties			
		Shortage	Turnover	Environment	Other
		%	%	%	%
Manager/Supervisor	53	45.5	24.5	17.0	13.2
Senior Systems Analyst	61	70.5	14.8	8.2	6.6
Junior Systems Analyst	22	54.5	36.4	-	9.1
Senior Programmer	68	69.1	20.6	7.4	2.9
Junior Programmer	44	50.0	27.3	13.6	9.1
Senior Programmer/ Analyst	65	70.8	13.8	9.2	6.2
Junior Programmer/ Analyst	37	56.8	18.9	16.2	8.1
Senior Methods/ Procedures Analyst	9	55.6	22.2	-	22.2
Junior Methods/ Procedures Analyst	3	-	66.7	-	33.3
Senior System Software Programmer	32	78.1	6.3	12.5	3.1
Junior System Software Programmer	11	63.6	27.3	-	9.1
Senior Systems Engineer/ Consultant	10	80.0	10.0	-	10.0
Junior Systems Engineer/ Consultant	5	60.0	40.0	-	-
Senior Computer Operator	37	43.2	32.4	16.2	8.1
Junior Computer Operator	33	33.3	42.4	15.2	9.1

3.5 Recruitment Concerns for the 80's

Survey respondents were asked to express their recruitment concerns for EDP personnel for the next five years, and 60 per cent of the firms identified shortages as their main concern.

The concerns of the respondents varied somewhat between firms in different industries and particular locations. While almost two-thirds of the firms in manufacturing considered the potential shortage of EDP personnel as their main recruitment concern over the next five years, only 43 per cent of the firms in the finance and insurance sector did so. In the case of service bureaus, while 52 per cent of the respondents cited shortages as their main concern, 30 per cent indicated concern about the quality of EDP personnel, including communication skills and attitudes to work. There was a general consensus in the frequency with which firms around the province expressed their concerns for the future, but it is noteworthy that the concern about the potential shortage of EDP personnel was particularly noticeable in the Kitchener/Cambridge area, where 80 per cent of the respondents indicated this as a problem in the future. In Northern Ontario, four of the nine responding firms felt that the remoteness of job site was their main concern in attracting EDP professionals.

CHAPTER IV

MINIMUM QUALIFICATIONS, SOURCES OF SUPPLY OF NEW HIRES AND TRAINING ACTIVITIES

This chapter analyzes the prevailing minimum educational and job-related experience requirements as well as the sources of supply of newly hired personnel for the job categories under study in 1980. In addition, this chapter examines the training activities provided to EDP personnel in the responding firms, and provides a summary of the advice respondents would give to a person hoping to enter the EDP field during the next five years.

4.1 Minimum Hiring Qualifications

The most often cited minimum educational requirement for the occupations under study is community college training. At the same time, more firms prefer a university education for senior level than for junior level positions, and for many firms, a secondary school education as a minimum academic requirement will suffice. The frequency with which respondents indicated the various levels of education as a minimum requirement for programmer/analysts is a case in point. For the senior level positions, about half of the firms require a community college education, but the remaining half are split equally in their preference for a university education (26 per cent) and a secondary school education (26 per cent). For the junior level programmer/analyst positions, 50 per cent of the firms indicated community college training as a minimum educational requirement, while a university education and a secondary school education is required by 19 and 30 per cent, respectively (see Table 13).

Against this general background, minimum educational requirements vary somewhat between job categories. Forty-three per cent of the respondents require a university education for manager/supervisor positions. In the case of programmer positions, however, only about 10 per cent of the firms require a university education, and in the case of computer operator positions, less than 1 per cent of the respondents indicated a preference for university education while some 80 per cent require a secondary school education (see Appendix A, Table 13).

Table 13

Summary of Educational Requirements and
Average Work Experience

JOB CATEGORY	SENIOR LEVEL			JUNIOR LEVEL		
	Per Cent of Firms Requiring		Average # of Years Experience	Per Cent of Firms Requiring		Average # of Years Experience
	Secondary School	Community College		Secondary School	Community College	
Manager/Supervisor	24.3	32.8	5.6	-	-	-
Systems Analyst	14.3	45.6	4.8	21.5	55.7	2.4
Programmer	29.8	58.0	3.4	34.5	55.6	1.1
Programmer/Analyst	25.7	48.6	3.2	27.7	53.6	1.8
Methods/Procedures Analyst	23.9	54.3	4.3	27.5	60.0	1.8
System Software Programmer	20.6	49.2	4.4	33.3	33.3	2.1
Systems Engineer/ Consultants	26.8	36.6	5.2	35.5	35.5	2.2
Computer Operator	78.1	20.8	2.4	81.9	17.6	1.0

In terms of job-related experience, senior level positions generally require between 2.5 and 5 years of related experience while for junior level positions the firms require between one and 2.5 years of experience. Again, on the basis of job categories there is some variation, and for certain categories, the requirement for a lengthier period of job-related experience is particularly noticeable. For manager/supervisor positions, for example, over one-third of the firms indicated that they require six or more years of related experience, and, in the case of senior systems engineer/consultant positions, just over 40 per cent of the firms indicated that they require at least six years of experience.

It is important to note, however, that experience as a requirement was not specified by all firms in all cases. This is particularly true for the entry level positions of junior programmer, junior systems engineer/consultant and junior computer operator; for these positions, between 17 and 37 per cent of the responding firms indicated that they do not require prior job-related experience (see Appendix A, Table 14 for more detailed information).

A more detailed analysis of experience requirements of the responding firms reveals that firms located in Ottawa reported a much higher experience requirement than firms in other locations. This was also true for firms with large computer installations and those from the government sector. Firms with small computers, however, reported relatively lower experience requirements. Variations in minimum educational requirements between firms by location, computer size and industry group were not substantial, however.

4.2 Sources of Supply of New Hires in 1980

The responding firms reported that during 1980 they hired a total of 1,009 new employees in the job categories under study. Programmers and computer operators accounted for over 50 per cent of the new hires. Another 30 per cent of the new hires were for systems analyst and programmer/analyst positions. The relative volume of new hires is approximately in line with the respective employment levels.

More than half of the new hires in 1980 were recruited from other businesses. Other businesses as a source of supply were particularly important for the senior level positions; for example, approximately 75 per cent of the newly hired systems analysts came from other establishments. As also might be expected, just over three-quarters of the newly hired managers/supervisors were recruited from other firms (see Table 14).

Universities and community colleges as a source of supply each accounted for about 15 per cent of the new hires in 1980. Universities as a source of new hires were more frequently cited for the junior level positions of systems analyst (31 per cent), programmer/analyst (34 per cent), programmer (20 per cent), and systems engineer/consultant (29 per cent). Community colleges, on the other hand, were cited as a significant source of supply for senior system software programmers and junior programmers and junior computer operators.

Secondary schools, which, as a source of supply accounted for only 7 per cent of the reported new hires in 1980, were an important source for computer operators.

Overseas recruitment does not appear to be a significant source of supply for the responding firms. Only between one and 2 per cent of the new hires - mostly for senior positions - came from outside Canada.

4.3 Training Activities for EDP Personnel

Between 50 and 75 per cent of the respondents provide on-the-job training, in-house training programmers and/or courses offered by hardware manufacturers to their EDP personnel. Significantly fewer firms, between 20 and 30 per cent, provide courses to their EDP staff that are offered by professional associations, colleges and universities, etc. Very few firms provide courses that are offered by technical schools.

A more detailed analysis (see Appendix A, Table 15), reveals certain preferences as to the types of training provided by the firms

Table 14

Sources of Supply of New Hires in 1980

JOB CATEGORY	No. of Responding Firms	No. of New Hires Reported in 1980	Per Cent Hired From Canadian Institution					Per Cent Hired From		
			Secondary School	Community College	University	Other	Other Business	Outside Canada	Other	
Manager/Supervisor	68	90	3.3	3.3	5.6	1.1	77.8	2.2	6.7	
Senior Analyst	44	56	-	1.8	10.7	-	73.2	3.6	10.7	
Junior Analyst	18	65	-	16.9	30.8	-	35.4	-	16.9	
Senior Programmer	51	90	2.2	5.6	6.7	2.2	66.7	4.4	12.2	
Junior Programmer	83	208	1.9	32.7	29.3	1.0	28.8	1.0	5.3	
Senior Programmer/ Analyst	72	109	0.9	2.8	6.4	3.7	75.2	5.5	5.5	
Junior Programmer/ Analyst	53	74	1.4	13.5	33.8	-	50.0	-	1.4	
Senior Methods/ Procedures Analyst	7	14	-	7.1	14.3	-	78.6	-	-	
Junior Methods/ Procedures Analyst	3	5	-	100.0	-	-	-	-	-	
Senior System Software Programmer	13	24	-	33.3	8.3	-	41.7	-	16.7	
Junior System Software Programmer	9	9	-	-	11.1	11.1	77.8	-	-	
Senior Systems Engineer/ Consultant	6	11	18.2	-	-	-	72.7	9.1	-	
Junior Systems Engineer/ Consultant	5	7	-	14.3	28.6	-	57.1	-	-	
Senior Computer Operator	51	98	15.3	5.1	1.0	5.1	69.4	-	4.1	
Junior Computer Operator	94	149	30.2	20.1	11.4	1.3	36.9	-	-	
TOTAL	-	1,009	7.2	15.0	15.4	1.7	53.1	1.7	5.9	

according to location, size of computer and industry. As the following tabulation shows, on-the-job training is provided more often by firms located in communities other than Ottawa or Toronto, by firms with medium-sized computers, and by members of the service bureau sector.

Table 15

Summary of Training Provided to EDP Professionals

TYPES OF TRAINING	Per Cent of Firms Providing Training	Preference by ¹		
		Location	Computer Size	Industry
On-the-Job Training	74.4	Rest of Ontario	Medium	Service Bureau
Hardware Manufacturers	64.4	Toronto	Medium	Manufacturing
In-House Programs	54.0	Toronto	Large	Finance
Professional Associations	27.9	Ottawa	Large	Government
Colleges and Universities	24.7	Ottawa	Large	Government
Short Educational Programs	22.1	Toronto	Medium	Finance
Technical Schools	8.4	Toronto	Large	Service Bureau

¹ According to the highest per cent of firms providing the type of training.

The duration of the training provided to EDP professionals is relatively short - averaging only 10 days per year per participating employee. As shown in the following table, three-quarters of the firms provide training for only up to 10 days:

Table 16

Average Duration of Training Per Employee

<u>Number of Days of Training Per Employee</u>	<u>Per Cent of Firms Reporting</u>
Up to 5 days	45.9
6 to 10 days	27.5
11 to 15 days	14.8
Above 15 days	11.8
Avg. No. of Days/Employee/Year	10.0 days

(see Appendix A, Table 16 for more detailed information).

4.4 Advice For New Entrants

Survey respondents were also asked to provide some advice in terms of educational requirements for those who wish to enter the EDP field in the 80's. Respondents' advice appears to be divided along the lines of their own firms' requirements, location, computer type and industry setting:

- Community college training in computer science was recommended as the best stepping stone for new entrants to the EDP field by three out of every ten respondents. These respondents tend to be located outside the major EDP centers of Toronto and Ottawa, have small computer installations, and belong to the manufacturing, trade, and the fast growing but relatively small service sector serving legal, medical, accounting and educational professions.
- Business courses were recommended by 19 per cent of the respondents. These respondents tend to be located in Eastern Ontario and the Kitchener/Cambridge area. They also tend to have large computer installations and are

heavily concentrated in the service bureaus and the transportation, communications and utilities sector.

- University education was recommended by slightly fewer respondents (17 per cent) than were business courses. Respondents advising young people to go the university route were more frequently from the Metropolitan Toronto and Ottawa areas, tend to have large computers, and usually represent various service industries.
- Co-op training was recommended by relatively few - only 9 per cent offered this type of advice. This advice was given more frequently by respondents from areas surrounding the Metropolitan Toronto area and by the government sector representatives.
- Specialization in software, hardware, system development, data base management or EDP auditing was advised by only about 8 per cent of the responding firms.

An appropriate summary of the diversity of the advice that these firms would give to young people embarking on an EDP career includes: "the ability to understand end-user requirements; the preparation of a good resume; the capability to be an all-around person; taking as many computer courses as possible; getting as much business exposure as possible in summer jobs; avoiding specialization; and joining a smaller company to learn all aspects of electronic data processing".

CHAPTER V

SUMMARY OF MAJOR FINDINGS

This chapter summarizes the major findings as they relate to projected manpower requirements to 1985 for selected professional and technical occupations in the information processing services sector in Ontario. Again, readers are cautioned against generalizing on the basis of the statistics presented in this report; the survey results should be regarded as an assessment of the information provided by the 430 responding firms.

5.1 Perspective on EDP Employment

Electronic data processing employment represents between 2 and 3 per cent of the total permanent employment in the responding firms. Of the nearly 8,000 EDP workers that were reported, 86 per cent work at the central computer installation, most often located at the head office. EDP employment is primarily found in the Metropolitan Toronto and Ottawa areas, in firms with large computer installations, and in the manufacturing and the all other industries sectors.

5.2 Occupational Characteristics

The responding firms reported about 5,600 workers in the eight job categories studied which, in turn, account for approximately 70 per cent of the reported EDP employment. The number employed in senior level positions slightly exceeds the number employed in junior level positions.

Computer operators represent the single largest group (24 per cent) among the surveyed occupations, while managers/supervisors, systems analysts, programmers and programmer/analysts account for another 67 per cent of the studied population. Employment in the methods/procedures analyst, system software programmer, and systems engineer/consultant categories accounted for the remaining 9 per cent of the total.

5.3 Projected Employment Growth

Employment in the eight job categories is expected to increase by about one-third over the next four years. On an annual basis, this means that employment should grow by about 8 per cent, or slightly faster than in the 1979-1981 period. Senior professionals are expected to continue to increase at a faster rate (53 per cent) than junior professionals (31 per cent). Higher or similar growth rates to the overall average growth rate are expected for all job categories except for the manager/supervisor and computer operator categories. Almost half of the new jobs to 1985 are expected to be in the programmer and programmer/analyst categories.

5.4 Variations in Projected Employment Growth by Location, Computer Size and Industry

Growth in firms with small and medium computers and in firms from the service bureau and the all other industries sectors will accelerate and contribute substantially more to new job creation to 1985 than in the past. Employment growth in small- and medium-sized firms should contribute about 68 per cent of the expected increase. The service bureau and all other industry sector firms are expected to account for about 60 per cent of the new jobs to be created. Firms with large computers are likely to contribute only 27 per cent of new job creation between 1981 and 1985 compared to 42 per cent in the past two years. Similarly, firms in the finance and insurance sector are likely to contribute only 11 per cent of the new jobs compared to 26 per cent between 1979 and 1981. Firms in the two major EDP centers - Metropolitan Toronto and Ottawa - should continue to create a proportionate share of the new jobs.

5.5 Replacement Patterns

For most job categories, over half of the respondents expect future replacement patterns to remain the same as in 1980, when the overall replacement rate averaged 21 per cent, primarily because of high replacement rates for the junior positions of computer operator, programmer, and programmer/analyst.

5.6 Hiring Difficulties

Firms reported that all senior positions, except managers/supervisors, were more difficult to fill than junior positions over the last twelve months. Hiring difficulties were more often reported by Ottawa-based firms, those firms with large computers and by firms in the service bureau sector. The most frequently cited reason for current difficulties was a shortage of qualified people available to fill current manpower requirements; this reason was also offered by six out of every 10 respondents as a recruitment concern for the 80's.

5.7 Minimum Hiring Qualifications

With the exception of managers/supervisors and computer operators, most of the responding firms require only community college training for the EDP professionals under study. While most respondents prefer university education for managers/supervisors, secondary education is acceptable for computer operators.

Senior positions usually require between 2.5 and 5 years of experience, whereas for junior positions firms usually require between one and 2.5 years of experience. However, for the entry level positions of junior programmer, junior systems engineer/consultant and junior computer operator, many firms do not require prior job-related experience.

5.8 Sources of Supply of New Hires in 1980

More than half of the new hires in 1980 were recruited from other businesses, while universities and community colleges each accounted for about 15 per cent of the new hires. Overseas recruitment does not appear to be a significant source of supply for the responding firms.

5.9 Training Activities

On the average, responding firms provide ten days of training per EDP employee annually. On-the-job training, courses provided by hardware manufacturers and in-house training programs are the most common types of training provided to the EDP personnel.

5.10 Advice for New Entrants to the EDP Field

A wide variety of advice was provided by responding firms for young people embarking on an EDP career in the next five years. However, community college training in computer science was recommended most frequently (three out of 10 respondents) as the best stepping stone for new entrants into the EDP field.

APPENDICES

Appendix A

Appendix A

Table 2

Employment in Electronic Data Processing by Industry
1981

BREAKDOWN	Responding Firms ¹		EDP Employees		Average No. of EDP Employees Per Firm
	No.	% of Total	No.	% of Total	
Manufacturing	156	38.5	2,251	28.4	14.4
Transportation, Communication & Utilities	30	7.4	289	3.6	9.6
Distribution	36	8.9	334	4.2	9.3
Finance & Insurance	24	5.9	1,049	13.2	43.7
Service Bureau	30	7.4	1,356	17.1	45.2
Education	30	7.4	660	8.3	22.0
Other Services	32	7.9	284	3.6	8.9
Government	25	6.2	1,159	14.6	46.4
Other Industry	42	10.4	544	6.9	13.0
TOTAL	405	100.0	7,926	100.0	19.6
¹ Of the total 430 responding firms, 25 did not provide total employment of EDP personnel.					

Appendix A

Table 3

Employment By Job Category, 1981

JOB CATEGORY	Firms Reporting		Reported Employment in 1981	
	#	%	#	%
Manager/Supervisor	388	90.2	982	17.5
Senior Systems Analyst	140	32.6	495	8.8
Junior Systems Analyst	65	15.1	363	6.5
Senior Programmer	156	36.3	475	8.5
Junior Programmer	167	38.8	606	10.8
Senior Programmer/ Analyst	185	43.0	508	9.1
Junior Programmer/ Analyst	121	28.1	324	5.8
Senior Methods/ Procedures Analyst	37	8.6	57	1.0
Junior Methods/ Procedures Analyst	25	5.8	36	0.6
Senior System Software Programmer	77	17.9	199	3.5
Junior System Software Programmer	42	9.8	89	1.6
Senior Systems Engineer/ Consultant	29	6.7	70	1.2
Junior Systems Engineer/ Consultant	17	4.0	41	0.7
Senior Computer Operator	305	70.9	714	12.7
Junior Computer Operator	247	57.4	652	11.7
TOTAL	-	-	5,611	100.0

Appendix A
Table 4
Employment by Location, Computer Size, and Industry,
Ontario, 1981

JOB CATEGORY	LOCATION			COMPUTER SIZE			INDUSTRY				
	Metro Toronto	Ottawa	Rest of Ontario	Small	Medium	Large	Manufacturing	Finance & Insurance	Service Bureau	Government	All Other Industries
Total	982	124	317	113	448	399	276	133	128	114	331
Manager/Supervisor	525	186	147	23	292	515	176	126	107	176	273
Systems Analyst	631	245	205	67	374	616	200	163	51	251	416
Programmer	487	108	237	57	352	390	225	89	258	80	180
Programmer/Analyst	52	9	32	1	34	54	32	20	16	7	18
Methods/Procedures Analyst	188	47	53	14	91	178	39	54	64	37	94
System Software Programmer	63	26	22	29	33	47	6	11	26	15	53
Systems Engineer/Consultant	694	290	382	155	607	572	309	137	222	224	474
Computer Operator	3,181	1,035	1,395	459	2,231	2,771	1,263	733	872	904	1,839
TOTAL	5,611										

Appendix A
Table 5

Employment of the 15 Surveyed Occupations, 1979-1981

JOB CATEGORY	No. of Responding Firms	Actual Employment			Employment Change 1979-1981 % of Total	Per Cent Change 1979-1981
		1979	1980	1981		
Manager/Supervisor	355	790	830	885	95	12.0
Senior Systems Analyst	104	337	364	391	54	16.0
Junior Systems Analyst	49	318	339	345	27	8.5
Senior Programmer	120	306	342	358	52	17.0
Junior Programmer	112	327	358	396	69	21.1
Senior Programmer/ Analyst	132	360	388	421	61	16.9
Junior Programmer/ Analyst	79	256	362	273	17	6.6
Senior Methods/ Procedures Analyst	24	30	32	37	7	23.3
Junior Methods/ Procedures Analyst	14	20	20	23	3	15.0
Senior System Software Programmer	49	113	137	141	28	24.8
Junior System Software Programmer	29	54	58	55	1	1.9
Senior Systems Engineer/ Consultant	21	48	48	59	11	22.9
Junior Systems Engineer/ Consultant	11	24	30	34	10	41.7
Senior Computer Operator	259	567	593	654	87	15.3
Junior Computer Operator	193	525	536	548	23	4.4
TOTAL	-	4,075	4,337	4,620	545	13.4

1 Includes only those firms who reported employment for 1979, 1980 and 1981.

Appendix A

Table 6

Employment of Surveyed Occupations
by Location, Computer Size, and Industry
1979-1981

BREAKDOWN	Actual Employment		Employment Change 1979-1981		Per Cent Change 1979-1981
	1979	1981	No.	% of Total	
<u>Location:</u>					
Metropolitan Toronto	2,268	2,535	267	49.0	11.8
Ottawa	833	925	92	16.9	11.0
Rest of Ontario	974	1,160	186	34.1	19.1
<u>Computer Size:</u>					
Small Computer	326	399	73	13.4	22.4
Medium Computer	1,645	1,859	214	39.3	13.0
Large Computer	2,014	2,240	226	41.5	11.2
Not-Reported	90	122	32	5.9	35.6
<u>Industry:</u>					
Manufacturing	921	1,045	124	22.8	13.5
Finance & Insurance	513	655	142	26.1	27.7
Service Bureau	703	778	75	13.8	10.7
Government	750	818	68	12.5	9.1
All Other Industries	1,188	1,324	136	25.0	11.9
TOTAL	4,075	4,620	545	100.0	13.4

Appendix A

Table 7

Employment by Major Job Category, 1981-1985

JOB CATEGORY	1981*		1985*	
	No.	% of Total	No.	% of Total
Manager/Supervisor	935	18.6	1,094	16.4
Systems Analyst	798	15.8	1,056	15.8
Programmer	854	17.0	1,254	18.8
Programmer/Analyst	790	15.7	1,157	17.4
Methods/Procedures Analyst	86	1.7	114	1.7
System Software Programmer	230	4.6	324	4.9
Systems Engineer/Consultant	98	1.9	195	2.9
Computer Operator	1,244	24.7	1,469	22.0
TOTAL	5,035	100.0	6,663	100.0
* Includes only those firms that reported employment in 1981 and 1985.				

Appendix A
Table 8

Employment of the 15 Surveyed Occupations, 1981-1985

JOB CATEGORIES	No. of Responding Firms	Actual Employment 1981	Projected Employment 1985	Employment Change 1981-1985		Per Cent Change 1981-1985
				No.	% of Total	
Manager/Supervisor	365	935	1,094	159	9.8	17.0
Senior Systems Analyst	132	474	674	200	12.3	42.2
Junior Systems Analyst	54	324	382	58	3.6	17.9
Senior Programmer	144	400	662	262	16.1	65.5
Junior Programmer	149	454	592	138	8.5	30.4
Senior Programmer/ Analyst	171	487	750	263	16.2	54.0
Junior Programmer/ Analyst	108	303	407	104	6.4	34.3
Senior Methods/ Procedures Analyst	33	55	71	16	1.0	29.1
Junior Methods/ Procedures Analyst	21	31	43	12	0.7	38.7
Senior System Software Programmer	72	166	232	66	4.1	39.8
Junior System Software Programmer	36	64	92	28	1.7	43.8
Senior Systems Engineer/ Consultant	26	67	128	61	3.7	91.0
Junior Systems Engineer/ Consultant	13	31	67	36	2.2	116.1
Senior Computer Operator	282	668	787	119	7.3	17.8
Junior Computer Operator	222	576	682	106	6.5	18.4
TOTAL	-	5,035	6,663	1,628	100.0	32.3

1 Includes only those firms who reported employment for 1981 and 1985.

Appendix A

Table 9

Employment of Surveyed Occupations
by Location, Computer Size, and Industry
1981-1985

BREAKDOWN	Actual Employment	Projected Employment	Employment Change 1981-1985		Per Cent Change 1981-1985
	1981	1985	No.	% of Total	
<u>Location:</u>					
Metropolitan Toronto	2,767	3,598	831	51.0	30.0
Ottawa	992	1,277	285	17.5	28.7
Rest of Ontario	1,276	1,788	512	31.4	40.1
<u>Computer Size:</u>					
Small Computer	448	804	356	21.9	79.5
Medium Computer	2,042	2,794	752	46.2	36.8
Large Computer	2,414	2,857	443	27.2	18.4
Not-Reported	131	208	77	4.7	58.8
<u>Industry:</u>					
Manufacturing	1,160	1,467	307	18.9	26.5
Finance & Insurance	674	851	177	10.9	26.4
Service Bureau	866	1,183	317	19.5	36.6
Government	859	1,026	167	10.3	19.4
All Other Industries	1,476	2,136	660	40.5	44.7
TOTAL	5,035	6,663	1,628	100.0	32.3

Appendix A
Table 10

Replacement Rates by Location, Computer Size, and Industry, 1981

JOB CATEGORY	Total	LOCATION			COMPUTER SIZE			INDUSTRY				
		Metro Toronto	Ottawa	Rest of Ontario	Small	Medium	Large	Manufacturing	Finance & Insurance	Service Bureau	Government	All Other Industries
Manager/Supervisor	13.2	15.5	13.7	10.7	15.6	14.4	8.3	14.7	15.0	5.8	20.7	11.5
Senior Systems Analyst	22.5	24.3	21.6	20.9	36.0	23.8	17.5	26.4	23.4	5.6	36.6	20.2
Junior Systems Analyst	21.1	23.2	39.2	10.0	-	20.8	29.1	35.3	18.4	-	-	7.0
Senior Programmer	23.1	22.8	27.4	22.1	23.3	25.4	18.3	33.7	12.4	18.3	28.3	15.9
Junior Programmer	34.1	34.7	32.0	34.0	56.8	31.7	32.5	32.5	40.0	25.6	50.0	32.2
Senior Programmer/Analyst	20.5	24.3	20.1	17.2	15.7	20.4	26.5	21.0	11.9	28.5	20.6	19.4
Junior Programmer/Analyst	27.1	24.8	33.2	27.2	20.0	28.7	25.7	28.1	17.9	14.3	54.3	26.0
Senior Methods/Procedures Analyst	15.8	26.7	-	-	-	11.0	23.8	22.0	-	-	-	-
Junior Methods/Procedures Analyst	17.9	-	-	-	-	5.5	-	-	-	-	-	-
Senior System Software Programmer	12.5	22.4	5.4	5.8	-	14.1	16.1	20.0	9.2	-	-	17.8
Junior System Software Programmer	17.9	24.6	-	15.1	-	10.9	-	19.6	20.0	-	-	-
Senior Systems Engineer/Consultant	5.7	7.2	3.9	-	-	5.8	11.7	-	-	-	-	9.4
Junior Systems Engineer/Consultant	10.5	-	-	-	-	4.0	-	-	-	-	-	-
Senior Computer Operator	15.8	13.3	17.9	18.1	11.0	16.3	16.3	18.0	14.6	24.5	8.9	13.8
Junior Computer Operator	31.8	35.7	32.5	28.5	32.5	34.2	27.0	27.5	34.6	16.9	37.3	34.9
TOTAL	21.0	23.0	22.5	18.5	22.0	21.3	19.4	23.3	20.7	12.5	27.3	19.7

Note: Replacement rates for less than 5 respondents are not shown.

Appendix A

Table 11

Replacement Rates to 1985 Relative to 1980

JOB CATEGORY	No. of Responding Firms	Per Cent of Firms Indicating Rates To Be		
		Higher $\frac{\%}{\%}$	Lower $\frac{\%}{\%}$	Same $\frac{\%}{\%}$
Manager/Supervisor	264	21.6	9.1	69.3
Senior Systems Analyst	115	39.1	16.5	44.5
Junior Systems Analyst	55	29.1	10.9	60.0
Senior Programmer	114	34.2	8.8	57.0
Junior Programmer	123	38.2	15.8	48.0
Senior Programmer/ Analyst	145	35.2	12.4	52.4
Junior Programmer/ Analyst	91	34.1	12.1	53.8
Senior Methods/ Procedures Analyst	29	20.7	13.8	65.5
Junior Methods/ Procedures Analyst	23	30.4	8.7	60.9
Senior System Software Programmer	60	48.3	6.7	45.0
Junior System Software Programmer	33	33.3	9.1	57.6
Senior Systems Engineer/ Consultant	28	28.6	3.6	67.9
Junior Systems Engineer/ Consultant	18	22.2	11.1	66.7
Senior Computer Operator	208	29.3	9.6	61.1
Junior Computer Operator	171	26.9	19.3	53.8

Appendix A
Table 12
Hiring Difficulties* By Location, Computer Size, and Industry
1981

JOB CATEGORY	LOCATION			COMPUTER SIZE			INDUSTRY			
	Metro Toronto	Ottawa	Rest of Ontario	Small	Medium	Large	Manufac- turing	Finance & Insurance	Service Bureau	Other Industries
Manager/Supervisor	13.7	14.8	17.6	11.3	12.9	15.4	13.2	32.0	17.2	10.4
Senior Systems Analyst	42.1	32.9	47.4	41.2	42.9	38.7	46.5	46.7	35.2	42.0
Junior Systems Analyst	27.7	24.2	36.4	33.3	35.1	9.5	31.6	18.2	37.5	26.3
Senior Programmer	41.7	36.1	75.0	41.7	39.8	42.9	37.7	29.4	90.0	36.8
Junior Programmer	21.6	20.0	44.4	31.8	19.6	16.7	17.4	14.3	50.0	17.9
Senior Programmer/ Analyst	34.6	32.9	57.9	36.4	30.4	38.7	27.8	30.8	52.9	35.3
Junior Programmer/ Analyst	26.4	32.1	18.8	6.3	27.3	29.2	31.3	9.1	50.0	17.1
Senior Methods/ Procedures Analyst	16.2	11.8	16.7	-	22.2	6.3	14.3	28.6	-	11.1
Junior Methods/ Procedures Analyst	-	-	-	-	-	-	-	-	-	-
Senior System Software Programmer	40.3	36.6	35.7	80.0	33.3	42.9	38.9	54.5	60.0	33.3
Junior System Software Programmer	19.0	15.0	37.5	50.0	20.0	-	16.7	12.5	-	30.8
Senior Systems Engineer/ Consultant	31.0	30.8	55.6	33.3	35.7	20.0	40.0	-	42.9	30.0
Junior Systems Engineer/ Consultant	17.6	14.3	50.0	50.0	14.3	-	33.3	-	-	33.3
Senior Computer Operator	8.5	5.9	14.8	3.8	9.1	13.5	7.3	9.1	20.0	7.4
Junior Computer Operator	7.7	5.7	7.7	11.1	6.3	8.2	5.5	15.8	18.2	8.3
TOTAL	21.4	20.1	32.8	19.5	21.4	20.4	19.5	23.1	36.1	19.0

* Firms reporting hiring difficulties as a percentage of total employing establishments.

Appendix A

Table 13

Minimum Educational Requirements, 1981

JOB CATEGORY	No. of Responding Firms	Minimum Educational Requirements		
		Secondary School %	Community College %	University %
Manager/Supervisor	235	24.3	32.8	43.0
Senior Systems Analyst	125	14.3	45.6	40.0
Junior Systems Analyst	79	21.5	55.7	22.8
Senior Programmer	131	29.8	58.0	12.2
Junior Programmer	142	34.5	55.6	9.9
Senior Programmer/ Analyst	144	25.7	48.6	25.7
Junior Programmer/ Analyst	112	27.7	53.6	18.8
Senior Methods/ Procedures Analyst	46	23.9	54.3	21.7
Junior Methods/ Procedures Analyst	40	27.5	60.0	12.5
Senior System Software Programmer	63	20.6	49.2	30.2
Junior System Software Programmer	48	33.3	33.3	33.3
Senior Systems Engineer/ Consultant	41	26.8	36.6	36.6
Junior Systems Engineer/ Consultant	31	35.5	35.5	29.0
Senior Computer Operator	183	78.1	20.8	1.1
Junior Computer Operator	193	81.9	17.6	0.5

Appendix A
Table 14
Minimum Job-Related Experience Required, 1981

JOB CATEGORY	No. of Responding Firms	Minimum Experience Requirements					Average Experience Requirements
		None	1 - 2 years	3 - 5 years	6 - 8 years	over 8 years	
Manager/Supervisor	200	1.0	13.5	51.5	14.5	19.5	5.6 years
Senior Systems Analyst	104	-	10.6	74.0	11.5	3.8	4.8 years
Junior Systems Analyst	59	6.8	47.5	44.1	-	1.7	2.4 years
Senior Programmer	110	2.7	28.2	63.6	-	5.5	3.4 years
Junior Programmer	97	25.8	69.1	4.1	1.0	-	1.1 years
Senior Programmer/ Analyst	133	2.3	29.3	66.2	1.5	0.8	3.2 years
Junior Programmer/ Analyst	83	9.6	75.9	12.0	-	2.4	1.8 years
Senior Methods/ Procedures Analyst	34	-	26.5	58.8	5.9	8.8	4.3 years
Junior Methods/ Procedures Analyst	27	7.4	70.4	22.2	-	-	1.8 years
Senior System Software Programmer	49	2.0	14.3	61.2	20.4	2.0	4.4 years
Junior System Software Programmer	34	8.8	58.8	29.4	2.9	-	2.1 years
Senior Systems Engineer/ Consultant	29	3.4	17.2	37.9	27.6	13.8	5.2 years
Junior Systems Engineer/ Consultant	18	16.7	50.0	33.3	-	-	2.2 years
Senior Computer Operator	145	5.5	60.0	31.0	2.8	0.7	2.4 years
Junior Computer Operator	117	36.8	58.1	2.6	1.7	0.9	1.0 years

Appendix A

Table 15

Type of Training Provided to EHP Personnel

BREAKDOWN	No. of Responding Firms	Type of Training Provided							
		In-house %	On-the- Job %	Courses by Colleges or Universities %	Courses by Technical Schools %	Hardware Manufact- urers %	Professional Associations %	Short Educational Program %	Other %
<u>Location:</u>									
Metropolitan Toronto	178	59.6	75.3	21.3	9.6	66.3	28.1	25.3	9.0
Ottawa	38	47.4	71.1	44.7	7.9	50.0	34.2	15.8	18.4
Rest of Ontario	214	50.5	74.3	23.8	7.5	65.4	26.6	20.6	10.3
<u>Computer Size:</u>									
Small Computer	94	53.2	74.5	19.1	4.3	54.3	21.3	13.8	6.4
Medium Computer	242	51.2	74.4	21.5	9.1	69.8	26.9	26.4	9.5
Large Computer	72	65.3	80.6	41.7	12.5	65.3	44.4	22.2	20.8
Not-Reported	22	50.0	54.5	27.3	4.5	45.5	13.6	9.1	4.5
<u>Industry:</u>									
Manufacturing	164	54.3	67.1	21.3	6.7	70.7	26.8	25.0	8.5
Finance & Insurance	25	76.0	72.0	16.0	8.0	68.0	32.0	28.0	28.0
Service Bureau	31	61.3	83.9	25.8	16.1	35.5	25.8	9.7	9.7
Government	30	53.3	76.7	46.7	6.7	63.3	40.0	13.3	26.7
All Other Industries	180	49.4	79.4	25.0	8.9	63.3	26.7	22.2	7.2
TOTAL	430	54.0	74.4	24.7	8.4	64.4	27.9	22.1	10.5

Appendix A

Table 16

Average Duration of Training Per Employee

BREAKDOWN	No. of Responding Firms	Number of days of Training Per Employee				Average No. of days Per Employee
		Up to 5 days %	6 - 10 days %	11 - 15 days %	Above 15 days %	
<u>Location:</u>						
Metropolitan Toronto	131	47.3	22.9	18.3	11.5	9.8
Ottawa	28	46.4	32.1	3.6	17.9	11.0
Rest of Ontario	146	44.5	30.8	13.7	11.0	9.8
<u>Computer Size:</u>						
Small Computer	60	45.0	26.7	13.3	15.0	9.7
Medium Computer	183	45.9	26.2	17.5	10.4	9.9
Large Computer	51	51.0	31.4	7.8	9.8	10.2
Not-Reported	11	27.3	36.4	9.1	27.3	12.5
<u>Industry:</u>						
Manufacturing	115	43.5	32.2	15.7	8.7	9.4
Finance & Insurance	22	45.5	18.2	13.6	22.7	11.1
Service Bureau	21	38.1	38.1	9.5	14.3	11.4
Government	20	45.0	35.0	5.0	15.0	11.6
All Other Industries	127	49.6	22.0	16.5	11.8	9.8
TOTAL	305	45.9	27.5	14.8	11.8	10.0

Appendix B

SURVEY METHODOLOGY

This study used the employer survey approach to determine the future manpower requirements for selected professional and technical occupations in the information services sector in Ontario over the 1981-1985 period. The study, jointly sponsored by the Labour Market Research Group of the Ontario Manpower Commission, the Planning and Development Branch of the Ontario Ministry of Colleges and Universities, and the Canadian Information Processing Society, was conducted in three stages.

First, information processing personnel are defined as those who provide information processing services to primary end-users. Information processing services include the systematic collection, processing, storage, retrieval, and delivery of information for application by end-users, who have some degree of control over the nature, purpose and scope of the data processing system. After extensive consultation with industry experts, the following job categories have been identified for study:

- . manager/supervisor
- . systems analyst
- . programmer
- . programmer/analyst
- . methods/procedures analyst
- . system software programmer
- . systems engineer/consultant
- . computer operator

Second, a two-page questionnaire, together with a survey guide, was sent to approximately 1,800 Ontario firms that are involved in the information processing services sector. The Canadian Information Processing Society co-ordinated the distribution and collection of the questionnaire from its members. The survey questionnaire, which was jointly designed by the Ontario Manpower Commission and the Ontario Ministry of Colleges and Universities, asked for detailed information on: employment levels of the the surveyed occupations between 1979-1981; their projected requirements to 1985; replacement rates and hiring difficulties; minimum hiring qualifications;

sources of supply of new hires; and types of training the respondents provide to their EDP personnel. In addition, the survey respondents were also asked to express their concerns in recruiting EDP personnel in the 80's and give advice to those who wish to enter the EDP field over the next five years.

Finally, the Labour Market Research Group of the Ontario Manpower Commission completed the analysis. For the purpose of statistical comparison, the data are tabulated by different categories by location, computer size and industry:

- the responding firms are grouped under three locations: Metropolitan Toronto, Ottawa and the rest of Ontario which includes Mississauga, Hamilton, Cambridge, Kitchener-Waterloo, London, Sarnia and Windsor, to name but a few.
- computer size is measured by the average monthly rental value (MRV) for computer hardware and/or computer services. The computer installations of the responding firms are grouped as follows:

Monthly Rental Value

Small Computer	Below \$5,000
Medium Computer	\$5,000-\$99,999
Large Computer	\$100,000 and up

- the responding firms are grouped under five industry sectors: manufacturing, finance and insurance, service bureau, government, and all other industries which include transportation, utility, communications, distribution, and service industry, etc.

APPENDIX C

Survey Questionnaire and Survey Guide



Canadian Information Processing Society
L'Association Canadienne de l'Informatique

243 College Street, 5th floor, Toronto, Ontario M5T 2Y1

25 February 1981

IMPORTANT: Survey of Manpower Requirements for Information Processing Personnel in Ontario

Dear Data Processing Manager:

I am enclosing a questionnaire regarding the future demand for information processing professionals in Ontario. As you are aware, there is a great deal of discussion in both the professional and popular press concerning the shortfall of information processing personnel, however, there is a distinct lack of hard reliable data concerning the size and persistency of this shortfall.

The Canadian Information Processing Society (CIPS) is conducting this survey which aims to gather data on manpower requirements to the next five years. CIPS is undertaking this survey in conjunction with the Ontario Manpower Commission and the Ontario Ministry of Colleges and Universities. This survey is made possible with funding from the Ontario Manpower Commission.

The results of the survey when available will achieve three things:

1. Identify the size and persistency of the manpower shortfall.
2. Permit policymakers to make more effective decisions based on a better global view of manpower realities.
3. Enable employees and the appropriate relevant government agencies to develop training programs.

This survey is being sent to all respondents to the CIPS Annual Computer Census and to other likely respondents in Ontario. I urge you to take the time necessary to complete this questionnaire within the next two weeks.

Information as reported in this questionnaire will be published in summary form only and specific information on individual companies will not be released. Respondents will be sent a copy of the survey results on request.

If you have any questions, please do not hesitate to contact the CIPS Survey Co-ordinator, Mary Jean Kucerak at (416) 593-4040.

Thank you for your cooperation.

Yours truly

C.G.K. Bishop
National President

CGKB/ps

CALGARY, EDMONTON, FREDERICTON, GREATER VANCOUVER ISLAND, HALIFAX (BLUENOSE), HAMILTON (GOLDEN HORSESHOE), KINGSTON (EASTERN ONTARIO), KITCHENER/WATERLOO (GRAND VALLEY), LONDON, MONTREAL, OTTAWA, QUEBEC CITY, REGINA (QUEEN CITY), SASKATOON, SAINT JOHN, N.B. (LOYALIST), ST. JOHN'S, Nfld. (VIKING), TORONTO VANCOUVER, VICTORIA, WINNIPEG

Member of IFIP & ICCP

SURVEY OF MANPOWER REQUIREMENTS FOR INFORMATION PROCESSING PERSONNEL IN ONTARIO PAGE 1

1 PLEASE COMPLETE RESPONDENT ID: RESPONDENT NAME: ADDRESS: CITY/PROVINCE: POSTAL CODE: COMPLETED BY: JOB TITLE:	A00300-00 A B COMPUTER SERVICES LTD 824 VICTORIA ST N KITCHENER ONTARIO N2B3C1 TELEPHONE: (000) 000-0000 EXT0000 MR W R AHEENT GENERAL MANAGER	3 LOCATION OF CENTRAL COMPUTER INSTALLATION(S) IF DIFFERENT THAN SHOWN IN QUESTION 1.	5 TOTAL NUMBER OF PERMANENT EMPLOYEES (INCLUDING EDP) IN COMPANY
2 INDUSTRY CLASS	K	4 INDICATE (X) COST FOR COMPUTER HARDWARE AND/OR COMPUTER SERVICES. UNDER \$1,000 — \$10,000-\$19,999 — \$1,000-\$1,999 — 20,000- 49,999 — 2,000- 4,999 — 50,000- 99,999 — 5,000- 9,999 — 100,000- ABOVE —	6 TOTAL NUMBER OF EDP PERSONNEL AT ALL LOCATIONS IN COMPANY 7 TOTAL NUMBER OF EDP PERSONNEL AT CENTRAL INSTALLATIONS

J O B C A T E G O R Y	8 TOTAL EDP PERSONNEL AS AT MID FEBRUARY 1979(1990)1981	9A TOTAL EMPLOYEES AT PROJECTED FOR 1985	9B PROJECTED ANNUAL GROWTH RATE %	10A AVERAGE REPLACEMENT RATE FOR 1980 %	10B INDICATE IF REPLACEMENT RATE IS (H) HIGHER (L) LOWER (S) SAME TO 1985	11A INDICATE (X) IF HIRING DIFFICULTIES EXPERIENCED	11B INDICATE REASON (T) TURNOVER (E) ENVIRONMENTAL (S) SHORTAGE (O) OTHER
MANAGERS/SUPERVISORS							
SNR ANALYST							
JR ANALYST							
SNR PROGRAMMER							
JR PROGRAMMER							
SNR PROGRAMMER/ANALYST							
JR PROGRAMMER/ANALYST							
SNR METHODS/PROCEDURES ANALYST							
JR METHODS/PROCEDURES ANALYST							
SNR SYSTEM SOFTWARE PROGRAMMER							
JR SYSTEM SOFTWARE PROGRAMMER							
SNR SYSTEMS ENGINEER/CONSULTANT							
JR SYSTEMS ENGINEER/CONSULTANT							
SNR COMPUTER OPERATOR							
JR COMPUTER OPERATOR							

J O B C A T E G O R Y	12 MINIMUM ACCEPTABLE REQUIREMENTS		13 NO. OF 1980		14 SOURCES OF SUPPLY			
	EDUCATION: TYPE, DEGREE	EXPERIENCE	NEW	HIRES	NO. HIRED CANADIAN	INSTITUTIONS	NO. HIRED FROM	
	SECONDARY/COMMUNITY	NO. YEARS			SECONDARY/COMMUNITY	OTHER	OUTSIDE	
	SCHOOL	AND TYPE			COLLEGE	UNIV.	OTHER BUS.	CANADA
								OTHER
MANAGERS/SUPERVISORS								
SNR ANALYST								
JR ANALYST								
SNR PROGRAMMER								
JR PROGRAMMER								
SNR PROGRAMMER/ANALYST								
JR PROGRAMMER/ANALYST								
SNR METHODS/PROCEDURES ANALYST								
JR METHODS/PROCEDURES ANALYST								
SNR SYSTEM SOFTWARE PROGRAMMER								
JR SYSTEM SOFTWARE PROGRAMMER								
SNR SYSTEMS ENGINEER/CONSULTANT								
JR SYSTEMS ENGINEER/CONSULTANT								
SNR COMPUTER OPERATOR								
JR COMPUTER OPERATOR								

CANADIAN INFORMATION PROCESSING SOCIETY 243 COLLEGE STREET 5TH FLOOR
TORONTO ONTARIO M5T 2Y1 (416) 593-4040
SURVEY OF MANPOWER REQUIREMENTS FOR INFORMATION PROCESSING PERSONNEL IN ONTARIO PAGE 2

RESPONDENT NAME: A B COMPUTER SERVICES LTD

15 WHAT IS THE AVERAGE NUMBER OF DAYS OF WEEKS PER YEAR, PER EDP EMPLOYEE THAT YOUR COMPANY PROVIDES FOR TRAINING? _____

16 INDICATE (X) THE TYPE OF TRAINING YOUR COMPANY PROVIDES TO EDP PERSONNEL AND DESCRIBE.

INDICATE	DESCRIBE
A IN-HOUSE	_____
B ON THE JOB TRAINING	_____
C COURSES BY COLLEGES OR UNIVERSITIES (INDICATE SPECIFIC COLLEGES, ETC. USED)	_____
D COURSES BY TECHNICAL SCHOOLS (INDICATE SPECIFIC TECHNICAL SCHOOLS)	_____
E HARDWARE MANUFACTURERS	_____
F PROFESSIONAL ASSOCIATIONS	_____
G SHORT EDUCATION PROGRAMMES	_____
H OTHER	_____

17 WHAT IN YOUR OPINION IS THE AREA OF MOST CONCERN IN RECRUITING EDP PERSONNEL IN THE 80'S? _____

18 WHAT ADVISE WOULD YOU GIVE TO A PERSON HOPING TO ENTER THE EDP FIELD DURING THE NEXT FIVE YEARS? FOR EXAMPLE, WHAT CERTIFICATION/DIPLOMAS SHOULD HE OR SHE OBTAIN? WHAT SPECIALIZATIONS OFFER THE BEST EMPLOYMENT PROSPECTS?

19 DO YOU WISH A COPY OF THE RESULTS OF THIS SURVEY?
YES ____ NO ____

**Survey of Manpower
Requirements for
Information Processing Personnel
in Ontario**

SURVEY GUIDE

sponsored by

**Canadian Information Processing Society
Ontario Manpower Commission
Ontario Ministry of Colleges and Universities**

February, 1981

Please read this guide carefully when completing the questionnaire.

Completed questionnaires are to be returned in the enclosed self-addressed mailing envelope no later than March 20, 1981.

If additional questionnaires are required or if you have any questions, please contact Mary Jean Kucerak at the CIPS Office (416) 593-4040.

Confidentiality: Information as reported in this questionnaire will be published in summary form only. Specific information on individual companies will not be released.

GENERAL INSTRUCTIONS

- Please provide the information requested for employment and other related questions for EDP personnel who are working in **Ontario** only.
- For purposes of this Survey, EDP personnel consist of employees who are working in units that provide information processing services to primary end users. These users (whether own firm or client firm) have some degree of control over the nature, purpose and scope of the system.

The information processing services include the systematic collection, processing, storage, retrieval and delivery of information for application by end users. This definition includes:

- (i) the design, development, testing, implementation and maintenance of automated and other systems required to provide the above function on behalf of end users;
- (ii) the selection, commissioning, evaluation and modification of hardware, software, communications and other capital items and configurations required for the operation of the above systems on behalf of end users;
- (iii) the operation of systems and the hardware/software/communication resources to produce information on a scheduled or demand basis on behalf of end users;
- (iv) the provision of specialized expertise in informatics or in general management function in support of the above.

Survey Questions

1. Indicate any changes to information as shown.
2. Indicate any change to Industry Classification as shown.

 - A Primary resources (agriculture, forestry, fisheries, mining, etc.)
 - B Construction
 - C Manufacturing
 - D Transportation
 - E Utility (public utility)
 - F Communications (radio, TV, newspaper, advertising, printing, publishing)
 - G Distribution (wholesale and retail)
 - H Financial (bank, trust company, investment dealers, stock exchange)
 - I Insurance
 - J Other Services (trade union, associations, consultant, etc.)
 - K Service Bureau (computer systems and software companies)
 - L Government (federal, provincial and municipal)
 - M Petroleum
 - P Educational
 - R Medical
 - S Legal
 - T Accounting
 - U Hospitality (restaurants, hotels, etc.)
 - O Other
3. Indicate the location (city) of the central computer installations(s) in **Ontario** if different from that shown in Question 1.
4. Indicate the average monthly cost for computer hardware and/or computer processing services in your organization in **Ontario** for the past 18 months (for computer hardware use rental equivalent if leased or purchased).
5. Indicate the total number of **permanent employees, including EDP personnel** in your company in **Ontario**.
6. Indicate the total number of **EDP personnel** only at all locations in your company in **Ontario**.
7. Indicate the total number of **EDP personnel** located at the **central installation(s)** in **Ontario**.

FOR QUESTIONS 8 — 14 refer to the job descriptions outlined on page 6 of this guide.

Note:

It is important that the categories outlined in the questionnaire be matched as closely as possible to the position description described below. If a position involves the duties of more than one category, classify the position according to the one category that accounts for the majority of working time. If the position is so varied that no one category accounts for the majority of the working time, do not match the position.

When determining the level of a position within a group (eg. programmer, analyst, etc) use the following qualifying characteristics as a guide:

SENIOR: Under general direction, formulates problems to be solved, usually competent to work at the highest technical level of all phases of the activity. May give some direction and guidance to lower level classifications.

JUNIOR: Under direct or immediate supervision, generally works on a single activity.

8. Indicate for **each job category** listed for which you have EDP personnel, the total number of full-time permanent employees in (mid February) 1979, (mid February) 1980, and (mid February) 1981.
9. (a) Indicate for each of the job categories listed, the total number of full-time permanent employees you expect to have in 1985.
- (b) Indicate for each of the job categories listed, the expected annual growth rate of employment for the 1981 — 1985 period.

To calculate growth rate, please follow the example below:

Example: Non-Compounded

Current employment in job category (1981)	20
Projected employment in job category (1985)	<u>25</u>
Net increase	5

Net increase as a percent of 1981

$$\frac{\# 1985 - \# 1981}{1981} \times 100 = 25.0\%$$

$$\text{Annual Average (4 years)} = 6.25\% \\ (25.0\% \div 4)$$

10. (a) Indicate for each of the job categories listed, the average replacement rate for 1980. For each job category include all employees who left their positions for whatever reason (promotion, transfer, left company, etc.)
- (b) Indicate what you expect the replacement rate to be relative to 1980 between now and 1985.
- 'S' — remain the same
'H' — higher
'L' — lower
11. (a) Indicate (x) opposite each of the job categories listed if you have experienced any hiring difficulties in the past 12 months. Hiring difficulties are defined as longer than 3 months to fill a position.
- (b) Indicate for each of the job categories listed, the reason(s) for hiring difficulties.
- 'S' — shortage
'T' — turnover
'E' — environmental
'O' — other

Shortage is defined as the lack of qualified people available to fill the current needs.

Turnover is defined as the vacancies created from people who have left or dropped out of the working force.

Environmental is defined as a change of conditions within an organization which have created a greater demand for people, i.e. new technology, new market expansion, conversion, etc.

Other — Please describe.

12. Indicate for each job category listed, the minimum educational and/or experience requirement for which you hired new personnel during 1980. Please specify the type of educational credentials and number of years of experience required, i.e. Grade 13 academic; Community College 2 yr. program; MA Computer Science, etc.
13. Indicate for each job category listed, the number of newly hired personnel from outside the company during 1980.
14. Indicate for each job category listed, the number of newly hired personnel in 1980 by source of supply, i.e. directly from a Canadian education institution, from another firm, from outside Canada, etc.
15. Indicate the average number of days per year, per EDP employee, that your company provides for training.

16. Indicate (x) the type of training that your company provides to EDP personnel and describe briefly.
17. What in your opinion will be the area of most concern in recruiting EDP personnel in the 80s?
18. What advice would you give to a person hoping to enter the EDP field during the next five years? For example, what certification/diplomas should he/she obtain? What specializations offer the best employment prospects?
19. Indicate if you would like a copy of the survey results.

Thank you for your cooperation.

JOB CATEGORIES — DESCRIPTIONS

Survey Questions 8 — 14

Manager/Supervisors

- Usually in full charge of all activities of a section or department. (i.e. Programming, Operations, etc.)
- Personally supervises the operations of his/her staff or directs the operation through subordinates.
- Involved in planning, organizing and controlling activities. (Do not include Manager of all Data Processing)

Systems Analyst

- Establishes current status of system under study and defines user requirement specifications.
- Assesses design alternatives, selects approach and prepares functional specifications.
- Plans the design, development, implementation and post implementation review stages of the system project.
- Schedules, co-ordinates and reports upon the development of logical and performance specifications.
- Schedules, co-ordinates and reports on the construction, acquisition and testing of all system components required to implement the system.
- Schedules, co-ordinates and reports on implementation activities necessary to move the system from test to production status.
- Plans, schedules and reports on the post implementation project review.
- Plans, schedules and controls the maintenance of the system.

Programmer

- Develops logical specifications from predetermined functional specifications for the development of application programs, systems or software required for either the operation of new systems, the improved operation of existing systems or the conversion of one system or file management technology to another.
- Codes, tests, evaluates and documents application programs, or applications systems software.
- Implements and maintains internally developed, or externally supplied application programs, systems or software.
- Participates in post implementation audit of installed systems and performs measurement tasks.
- Participates in application standards and security reviews.
- Provides help and advice in technical problem solving to operators and user personnel.

Programmer/Analyst

- Establishes current status of system under study and defines user requirement specifications.
- Assesses design alternatives, selects approach and prepares functional specifications.
- Develops logical specifications from predetermined functional specifications for the development of application programs, systems or software required for either the operation of new systems, the improved operation of existing systems or the conversion of one system or file management technology to another.
- Codes, tests, evaluates and documents application programs, or applications systems software.
- Implements and maintains internally developed, or externally supplied application programs, systems or software.
- Participates in post implementation audit of installed systems and performs measurement tasks.
- Participates in application standards and security reviews.
- Provides help and advice in technical problem solving to operators and user personnel.

Methods And Procedures Analyst

- From predetermined functional specifications, develops requirements for policy and procedure management and control; forms, file and record design, conversion and management; work methods and procedures; management information and control methods and procedures; space and facility planning; office machine evaluation and application; and, organizations and staff level development.
- Evaluates and plans the implementation of externally supplied clerical work aids, forms or office machinery.
- Implements internally developed methods, procedures, organization structures and internally and/or externally supplied methods, procedures, forms or office machinery.

- Conducts post implementation audit of installed clerical methods, procedures, forms and organization arrangements and installed office equipment.
- Participates in clerical systems standards and security reviews.
- Maintains internally developed procedures and organization arrangements or internally developed and/or externally supplied methods, forms and office equipment.

Systems Software Programmer

- Develops logical specifications from predetermined functional specification for the development of and changes to software.
- Codes, tests, evaluates and documents software. Implements internally developed or externally supplied software.
- Provides help and advice in technical problem solving to application and operators personnel.
- Maintains internally developed or externally supplied software.
- Conducts post implementation audit of installed systems software, participates in audit of application software and performs measurement and tracking tasks.
- Evaluates and plans the implementation of externally supplied software.
- Participates in software standards and security reviews.

Systems Engineer/Consultant

- Analyzes data processing requirements to determine electronic data processing system that will provide system capabilities required for projects or workloads, and plans layout of new system installation or modification of existing system, utilizing knowledge of electronics and data processing principles and equipment.
- Confers with data processing and project managerial personnel to obtain data on limitations and capabilities of existing system and capabilities required for data processing projects and workloads proposed.
- Analyzes data to determine, recommend, and plan layout for type of computer and peripheral equipment, or modifications to existing equipment and system, that will provide capability for proposed project or workload, efficient operation, and effective use of allotted space.

Computer Operator

- Organizes, controls and monitors the work flow through a computer configuration by operating the master console according to program, routines, subroutines and data requirements specified in operating instructions.
- Performs maintenance tasks associated with the assigned computer configurations.
- Monitors systems performance and maintains relevant statistics on computer performance.
- Plans and controls the work to be performed by making appropriate adjustments to schedules as required.

